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THE RETENTION AND THE LOSS OF THE HAIR FROM A PHYSIOLOGICAL STANDPOINT.

BY T. WESLEY MILLS, M.A., M.D.

In the *Popular Science Monthly* for October last, Mr. Eaton, in a paper entitled "A Bald and Toothless Future," states that as a result of years of observation of public assemblages of people, he is forced to conclude that there is, among men, relatively to women, a very disproportionate amount of baldness; that there may be deficiency of the hair of the head in the male sex to the extent of forty-six per cent.; and that it is more marked the higher the average culture of the assembly examined. This writer attributes the growing tendency to loss of hair prematurely to wearing tightly-fitting hair coverings, living within doors, and keeping the hair closely cropped. The condition is exaggerated by the influence of heredity. Mr. Eaton says:—"There is no reason why bald heads should not yield to the laws of heredity as much as curly heads or red heads." He further thinks that the early failure of the teeth has an analogous explanation with the loss of hair, viz.: decay from lack of use. The changes of conditions affected by modern civilization have rendered both comparatively useless to man.

Mr. Gouinlock, in the same magazine for May of the current year, under the title, "Hats as a Cause for Baldness," while agreeing that we are drifting towards that future indicated by Mr. Eaton, takes much narrower ground, and even combats several of the latter's conclusions. He believes that the common form of baldness is due entirely to the high hat and the hard felt hat that constrict the blood-vessels which nourish the hair bulbs. He also refers to the peculiar circumstances under which the blood-vessels of the head are distributed, so that they are especially exposed to pressure; and to a certain extent he reasons correctly, and, it may be added, zealously, to establish his thesis; but as I shall have occasion to show, his reasoning

is partial and his explanation inadequate. Both these writers have indicated the direction in which the truth lies, but neither gets at it wholly, as I shall now endeavour to show.

That Mr. Eaton is correct in believing that exposure of the body to the sun and air has something to do with hair production, any man may prove to his own satisfaction by leaving his arms or other portions of his body uncovered much more than usual, during a holiday season at the seaside or in the country. But Mr. Eaton states the case altogether too strongly for the influence of heredity. The degree to which such peculiarities as baldness are inherited is one of the most disputed matters; though unquestionably something must be allowed to such tendency, perhaps a good deal.

There can be no doubt that the loss of hair and of teeth prematurely are related in fact. Have such losses a common cause? Mr. Eaton's explanation is *disuse*. Professor Cope would explain the fact stated by dentists, that the last molar (wisdom) tooth and the lateral incisor of the upper jaw frequently do not appear, by what he calls "retardation" of the growth of the jaws, and to successively prolonged delay in the appearance of the teeth; while these again are related to an enlargement of the upper part of the head and of the brain. Is it not possible that all of these causes and perhaps others may combine to effect this result?

Taking up the case against the stiff hat, Mr. Gouinlock explains how readily the arteries can be compressed, especially when the hair is cropped close; he thinks the fact that below the line of pressure the hair remains, while it disappears above it, is quite clear upon his theory; and to account for the presence of hair over the temporal region when absent on the crown, he insists that here the temporal muscle acts as a cushion, preventing pressure. But this writer seems to forget that there are superficial and middle temporal arterial branches as well as deep ones, and that it is just these superficial ones (liable to pressure) that have most to do with supplying blood to the hair bulbs. He also takes no account of other methods besides pressure by

which blood can be cut off from a certain region. The familiar phenomena of blushing and pallor show that the nervous system has a controlling influence over the size of small arteries; and the fact that the hair may become grey in a few hours under violent emotion, carries with it the lesson that in some way the nutrition of the hair is regulated by this same nervous system.

To understand the physiological bearings of this subject, the somewhat complex relations of the blood-vessels of the brain, the face, the bones and muscles of the head, and of the scalp must be borne in mind. The arteries of the brain find an outlet for their blood, when it has passed through the capillaries and done its work, in those peculiar venous channels lying on the inner tables of the skull known as "sinuses"; these communicate with the veins of the softer osseous tissue (diploe) lying between the main tables of the cranial bones, which again have connections with the veins on the outside of the head. Now it is plain from this series of connections, that pressure on the scalp must influence the whole vascular system of the head back to the arteries of the brain, unless in some way counteracted. Pressure generally affects veins, from their superficial position, much more than arteries. The bad effects of venous dilation are seen in the slow-healing ulcers on the limbs of those with dilated (varicose) veins. Throughout his paper Mr. Gouinlock has directed his attention almost wholly to arteries rather than to veins. He has nowhere mentioned, what is commonly enough seen by the physician, that anastomotic arterial connections are especially opened up under the exigencies of disease, as from the pressure of tumours, &c.

Would nature refuse to combat the hard hat? Could she not adapt to it in a greater degree than Mr. Gouinlock's theory supposes? In looking at a plate portraying the course of the arteries of the head, it will be noticed that the terminal branches mount to the vertex of the skull and anastomose with their fellows of the opposite side by *very small* offshoots. As it is the smaller branches of arteries that are the most susceptible to changes in calibre,—can in fact be most readily influenced by the nervous mechanism, it is easy

to understand why that part of the scalp, with its hair bulbs supplied by them should, either from pressure or from lessening of calibre in response to nervous influence, be the area most to suffer. Hence the explanation of the fact that baldness of the vertex is the most marked. This must be so, however we account for the mal-nutrition, from the anatomical relations of the various blood-vessels.

The anthropological bearings of the hair are not without interest and importance. We find all varieties of hair, all degrees of hairiness, and great dissimilarity as to distribution over the body in different races of men.

The North American Indians have an abundance of hair on the head, with but little on the face or the rest of the body, while the hairiness of the Ainos has been remarked upon by many observers. Mr. Dickins writing in *Nature* for April 7th of the current year, states that the hair is most abundant in this latter race just where it would be most useful, as over the sternal, inter-scapular and gluteal regions, where, it may be remarked, the related epidermis itself is also thick. Professor Penhallow,¹ who has published several papers in this journal on the Ainos, states, in answer to specific enquiry, that the variety found among the Ainos in respect to relative hairiness, is probably explicable by associated climatic differences. If any large civilized community of the present day be examined, the race differences of men will all be found illustrated in this respect. Thus it is to be noticed that individuals and whole families have, like the Indian, abundance of hair on the head with but little elsewhere, while others are generally hairy like the Ainos. As one might expect from their both being dermal structures, an early development of hair &c., from sexual maturity is associated, I am told by a member of the dental profession of this city, with a correspondingly premature appearance of the wisdom teeth. Perhaps, however, such instances ought to be regarded as illustrations of general acceleration of maturity of the whole organization. It still remains to explain the early baldness of men and the exemption of women. Even if we accede to all that the

¹ Can. Rec. of Sc. II, 119.

writers in *Popular Science* claim, it does not suffice to explain the subject at all adequately. The great increase in the prevalence of all forms of nervous disease, and the modifications wrought in old forms of disease by the greater prominence of the nervous type of human being, points to the fact that our civilization makes calls upon the organization which tell especially on the nervous system. The strain of life falls in general, it will be conceded, most upon men. Man is the bread-winner; his anxieties, struggles, and disappointments, are both many and severe; and man is often prematurely bald for the same reason that he is prematurely old in other respects. Woman is less so because brain stress less frequently falls to her lot. But in connection with this must be taken, to complete the explanation, the fact that as with some races and some males of our own race, the vitality and persistence of the hair of the head in woman is specially marked. That overwork of the brain may influence the cephalic circulation (and so the hair) unfavorably, is evident enough from the dark circles beneath the eyes, owing to venous congestion, on the morning after unduly severe mental exercise, not to mention the headache from a similar cause; and it is not surprising that the vertex of the head, with its relatively variable and feeble blood supply, should suffer most—in a word, that the overworked or overworried man should be bald—unless, as in most women, there is unusual vitality of his hair bulbs. Baldness is one more of the many warnings of our day—one of Nature's protests against the irregular and excessive activity maintained in this restless age.

